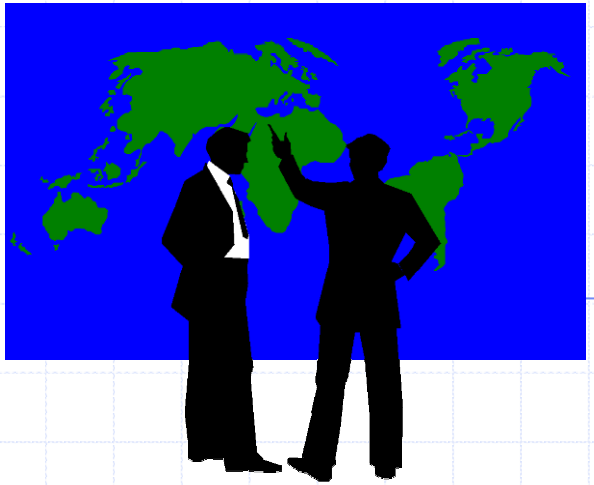
U.S. Department of Energy

OAK RIDGE NATIONAL LABORATORY

CHP Subcontractors Coordination Review Meeting

CHP/DG Applications and Analytical Support



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April 22, 2004
Oak Ridge National Laboratory's
Washington D.C. Office

CHP/DG Applications and Analytical Support

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Description of Tasks

- Task 1 – CHP Facility Database
- Task 2 – Installation Cost Analysis for Small CHP
- Task 3 – DG/CHP Financing Options
- Task 4 – Electric Rate Primer
- Task 5 – Lessons Learned from Small Packaged CHP Projects

Task 1 – CHP Facility Database

Objective: Collect basic information on existing CHP facilities and track new installations over time

- Measure progress toward CHP Challenge goal
- Gauge the impact of CHP on specific regions and applications

Overview: Builds upon previous work

- Complete merging and verification of EEA/Hagler Bailly data with EIA Non-utility Database
- Add additional sites from FEMP data, IDEA data, EEA reliability database and other sources
- Expand coverage of sites < 1 MW through equipment supplier and packager data

Task 1 – CHP Facility Database

Coordination: Work with manufacturers, packagers, ORNL contractors, associations and RACs

Deliverables: Annual CHP market summaries that profile existing CHP installations by state, application, fuel, and technology; Available in hard copy and on-line (eventually)

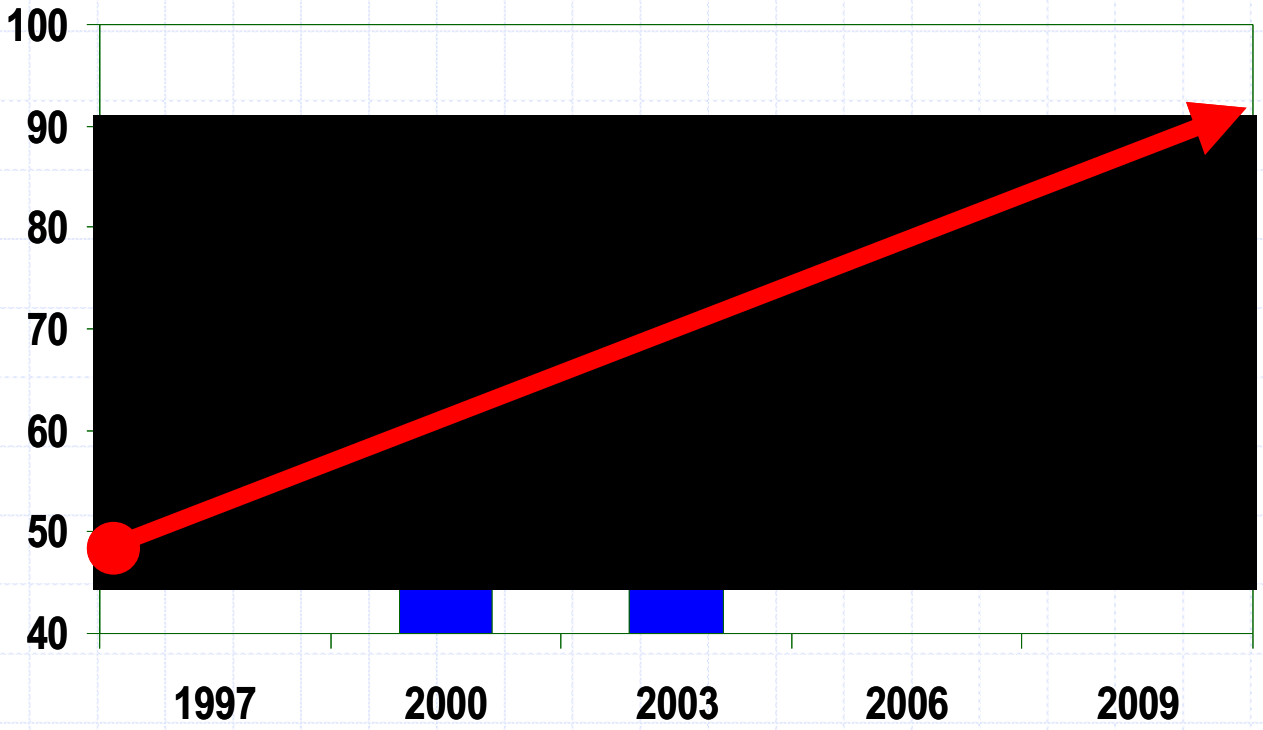
Timeline:

- 2000 and 2003 profiles completed end of 2003
- State profiles submitted to Regional Application Centers Feb 2004
- Annual updates to follow

Task 1 – CHP Facility Database

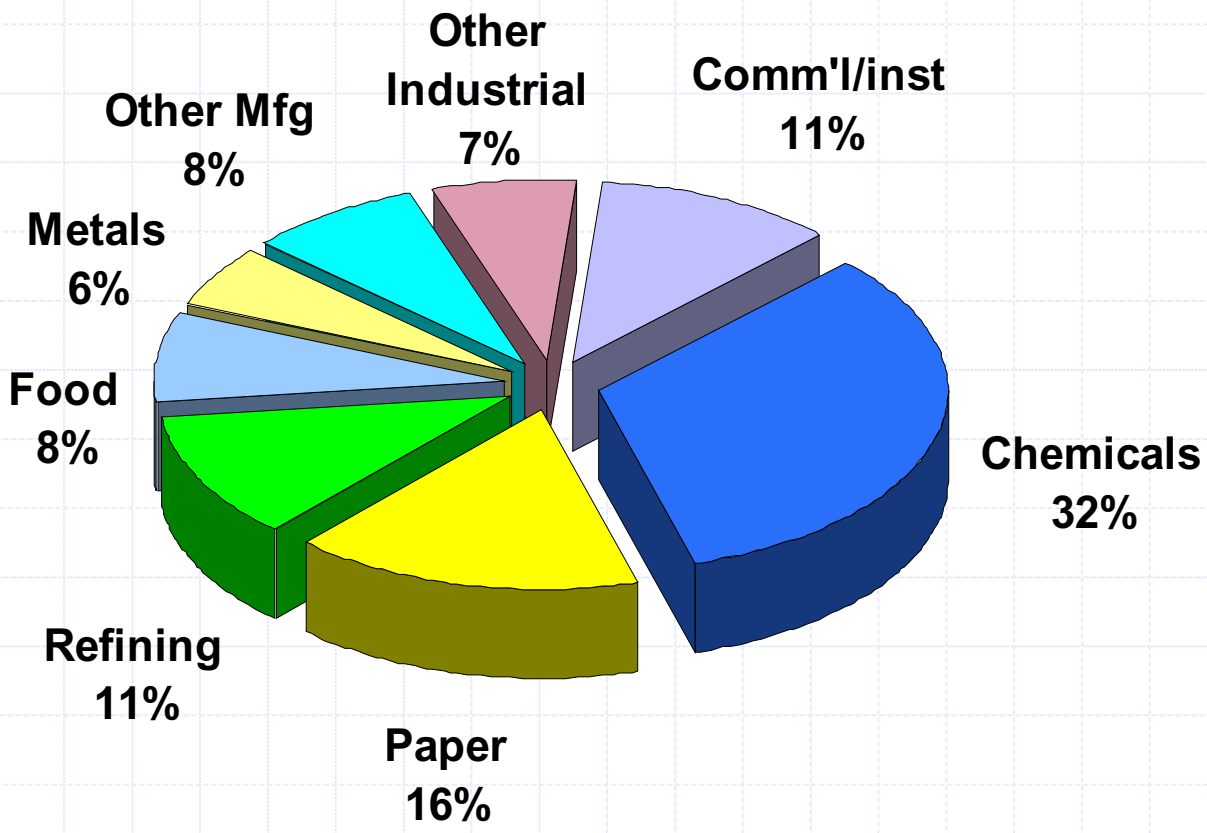
2003 Summary:

- 77,660 MW at 2749 sites
- Average capacity is 28 MW
- Median capacity is 2.8 MW



Task 1 – CHP Facility Database

2003 CHP Capacity: 77,660 MW



Task 1 – CHP Facility Database (FY 04-05 Plans)

- Expand Coverage
  - EIA 2002, Manufacturers, RAC input, trade press
- Update/Expand Ownership, Thermal Information
- Develop On-Line Version
- Annual Updates – fourth quarter

Task 2 – Installation Cost Analysis for Small CHP Systems

Objective: Quantify the range of small (<3 MW) CHP installation costs based on a sample of actual projects implemented in the last two years

- Detail installation costs for a mix of commercial, institutional, and light industrial customers
- Document driving factors to installed costs
- Identify areas for cost improvement

Task 2 – Installation Cost Analysis for Small CHP Systems

Task Overview:

- Develop Project Plan – completed
- Develop data survey – completed
- Identify sites for sample – completed
- Collect and review raw data – in process
- Installed cost characterization – 6/2004
- Final report – 7/2004
- Issues
  - Wide range of methods in recording costs
  - Confidentiality especially with regard to sensitive labor rates
  - Impact of state incentive programs on controlling costs

Task 2 – Installation Cost Analysis for Small CHP Systems

Progress Overview:

- Working with sites from EEA CHP database and SoCal Gas installation cost project.
- Microturbines and reciprocating engines very well represented with 11 and 10 sites respectively.
- Fuel cells represented with three sites.
- Currently gas turbine sites are under-represented.
  - Increase size limit to 5 MW for gas turbines
- Four to six more weeks are needed for data collection and verification.

Task 2 – Installation Cost Analysis for Small CHP Systems

FY04 Deliverables:

- Progress reports submitted with completion of each milestone
- Final report is primary publicly available deliverable (7/2004)

Coordination:

- Sites identified using EEA CHP installation database
- Sites contacted that participated in Reliability database project
- SoCal Gas and California Self-Generation Incentive Program
- NYSERDA CHP demonstration project

Task 3 – DG/CHP Financing Options

Objective: Evaluate the role of financing and ownership options in small CHP (< 2MW) deployment

- Internal hurdle rates for small CHP often high due to perceived risks and limited capital
- Various financing and ownership options are not well understood or documented for smaller CHP installations
- Provide overview of various financing and ownership options
- Compare effectiveness through case studies
- Highlight the pros and cons of different options

Task 3 – DG/CHP Financing Options

Coordination: Work with developers, ESCOs, financial institutions.

Deliverable: Public report that summarizes financing and ownership options, supported by case studies; hard copy and on-line version

Timeline: Task initiated FY2004, final report due after six months

Task 3 – DG/CHP Financing Options

Progress: Task initiated April 2004

- Develop Project Plan – draft completed
- Survey developers, suppliers, financiers – in process
- Summarize options, issues, problems – 5/2004
- Develop case study pro formas – 6/2004
- Draft report – 8/2004
- Final report – 10/2004

Task 4 – Electric Rate Primer

Objective: Identify primary types of electric rate structures and categorize their impact on on-site generation

- Growing recognition that tariff issues are key determinants of DG/CHP economics
- Need for detailed understanding of rate options and impact on DG/CHP for various state proceedings
- Identify range of applicable rate structures (retail and standby/backup)
- Compare impact on CHP economics for "sample customers" using applicable rates of specific utilities

Task 4 – Electric Rate Primer

Coordination: Work with regional CHP initiatives and Applications Center(s); CHP analysis team

Deliverable: Public report that profiles typical rate structures and their impact on on-site generation - hard copy and on-line version; Presentation(s) to state regulatory groups/NARUC

Timeline: Task initiated FY2004, Report August 2004

Task 4 – Electric Rate Primer

Progress: Task initiated January 2004

- Develop Project Plan – completed
- Collect rates on 30+ utilities – completed
- Running prototype customers on 5 to 7 utilities that represent tariff structures – in process
- Draft report – 6/2004
- Final report – 8/2004

Task 4 – Electric Rate Primer

Utility	Rate Structure	Utility Size (S, M, L)	Electric Costs (L, M, H)	CHP Potential (L, M, H)	Region
Commonwealth Edison (Exelon)	Demand FB-S /Energy TOU-2	L	H	M	Midwest
Boston Edison	FB-S/TOU-2-S	S	H	H	New England
Consolidated Edison	FB/TOU-2	L	H	H	North East
Florida Power and Light	FB/TOU-2	L	L	M	South East
Georgia Power	FB/TOU-3-S	L	L	L	South East
Niagara Mohawk	TOU-2/FB	M	M	M	North East
Pacific Gas and Electric	TOU-2-S	L	H	H	West
Southern California Edison	FB-S/TOU-3-S	L	H	H	West
Nevada Power and Light	FR/TOU-2-S	S	L	L	Mountain
Public Service Electric and Gas	FB/TOU-3-S	M	M	M	Mid Atlantic
PECO (Exelon)	FB	M	M	M	Mid Atlantic

Task 5 – Lessons Learned from Small Packaged CHP Projects

Overview: Evaluate successful and unsuccessful marketing approaches of small cogeneration/CHP packagers and developers

- Learn from the experiences of a wide variety of packagers and developers that pushed small cogen in the 1980s and early 1990s
- Compare to more recent approaches and strategies
- Based on surveys of past and present packagers and developers
- Identify application-specific issues and concerns

Task 5 – Lessons Learned from Small Packaged CHP Projects

Status: Planned FY2005 start – resources may be redirected to CHP Database enhancements

Questions?